



Photo by Dr. Victor L. Ford

# Stopping a Hidden Enemy from Robbing Alabama's Valuable Pine Stands

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**T**he thief comes when you least expect it, creeping in unseen and spreading its destruction everywhere. This stealthy adversary is not human or animal, but a fungus that robs loblolly pine trees of their value at their most productive

point. This fungus, *Heterobasidion annosum* (also known as *Fomes annosus*), saps the trees of their vigor by rotting away at the roots. Lack of water and nutrients places the tree under a great deal of stress, making it more vulnerable to other pests, such as bark beetles.

Occurring worldwide, the annosum fungus is a problem wherever conifers grow. (It can attack some hardwoods, but does not commonly do so.) It lives mostly as a saprophyte, or organism that

*(Continued on page 16)*

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(Continued from page 15)

grows on dead material, but it can make the transition to parasite when conditions are right. Though the fungus can enter the tree through root injury, the most common route of entry is through cut stumps. After the fungus starts to grow on the stumps, it then proceeds down the roots, destroying them along the way. It can also infect other trees by crossing the intertwined roots

of trees of the same species. In the past, annosum was not considered a problem when loblolly pine fiber was the main crop. This is because stands grown for fiber were not thinned, which meant the fungus never had a chance to enter the stand.

(Thinning is the practice of removing some trees in a stand to reduce crowding and to allow the remaining trees to grow faster.) However, with today's emphasis on value-added products, pine stands are thinned in order to produce quality

logs for structural material, which is over five times more valuable than pulpwood. Thinning has introduced annosum into pine stands, and the fungus is killing clumps of trees. The result? Some very valuable timber is lost.

Because of its cryptic nature, annosum root rot presents a significant challenge to forest managers. While an infected tree may appear perfectly healthy above ground, the fungus may have already begun attacking the root system. When symptoms do become visible in three to five years after thinning,

they usually include thinning and yellowing of the tree crown. However, by the time above-ground symptoms are apparent, the disease has already claimed a considerable portion of the root stock at a rate of spread of about ten feet per year, and the death of the tree may be imminent. The overall impact of annosum root rot is difficult to determine

with age, distinct white margin to the fruiting body when actively growing, lower surface is white becoming cream-colored with age, small white pads of mycelium are the first stage of fructification and resemble buttons (pustules), found on stumps of dead or dying trees at ground level covered with litter. Not finding the conk is no indication that the

fungus is not present since conks will occur on about half the trees. The rubbery conk is found in cooler months when cut stumps are most vulnerable to inoculation by the spores. The fungus can spread by asexual spores that are produced year round. In Alabama, fresh wood disks were placed in pine stands overnight to determine if spores were present. The amount of spores was considerably less during the summer months, but they were present.

What is the best way to prevent annosum? It's all a question of soil: the fungus cannot

colonize roots on soils with medium-to-high clay content, instead preferring well-drained, aerated soils. These are the sandy or silty soil textures which are the most likely to be thinned during the cool, wet periods. Susceptible soils contain low organic matter, and are generally old fields with less than three rotations of pine. The Natural Resources Conservation Service (NRCS) county soil survey can help determine if the soils are susceptible. The best way to prevent annosum is not to thin from October 1 to June 1 on susceptible soils.

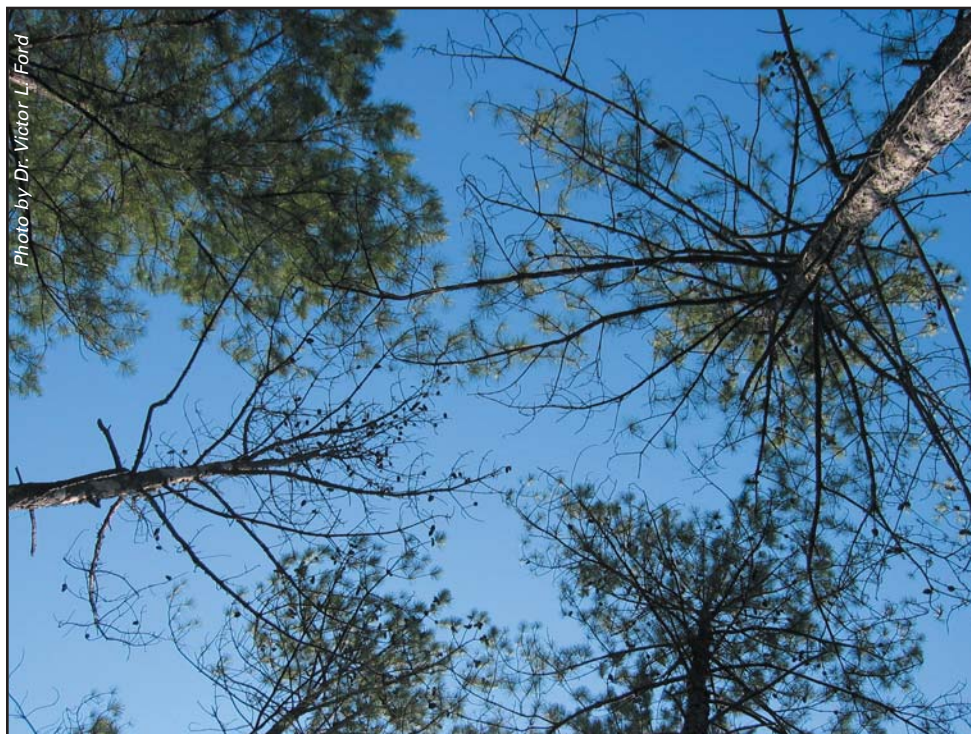


Photo by Dr. Vidar L. Ford

*This is an annosum pocket showing symptoms of the disease. Annosum means "ring," and the fungus spreads in a circular pattern around the infected stump through the roots. The tree on the left is already dead, and the tree on the top right has a fading crown and will die soon. Contrast the fading crown with healthy crowns surrounding it.*

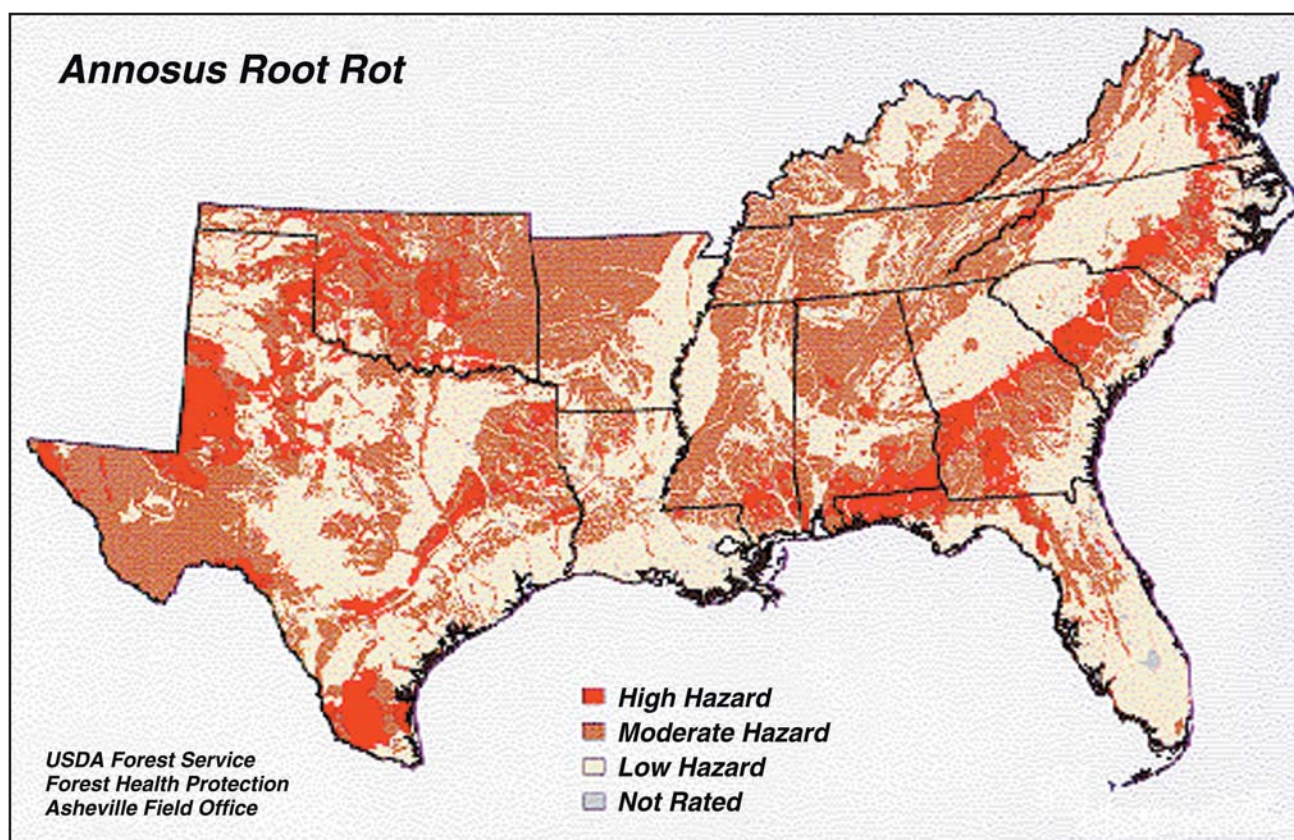
because the fungus is responsible not just for tree mortality, but also for an unsubstantiated amount of growth loss each year. Although tree deaths may continue for up to ten years, further losses may continue long afterwards due to an under-stocking of the stand.

The visible fruiting body of the fungus is called a conk, through which the air-borne spores are released and spread. The identifying characteristics are as follows: bracket forms (conk), rubbery and difficult to tear apart, color of top surface is reddish or dark brown becoming black



*Annosum conk at the base of a loblolly pine tree. Notice the brown top and the white underside. The litter was raked away to find the conks. Only about half of the infected trees will have conks, and conks do not appear until the tree is dead or nearly so.*

Lower density stands with shortened rotations should be considered in these situations. Longleaf pine has better resistance to annosum than loblolly, and is an alternative species to consider planting on these sites. In certain situations, it may be practical to cover the stumps completely with borax to prevent the disease. In Europe, a competitive fungus is applied to stumps as a biological control to prevent annosum from becoming established. It is applied to the stumps in clearcuts because annosum will also infect newly planted seedlings. (This situation does not appear to be a problem in Alabama because of our climate and decomposition rates.) Research is currently addressing the registration for this control agent in the United States, and it should be available in two or three years. Understanding the fungus and proper planning is the best way to keep this stealthy disease from robbing pine stands of their value. 🌲



*Hazard map of the southeastern United States (developed by the USDA Forest Service) showing annosum risk of pines planted on these soils. The red denotes the highest risk and the purple represents moderate risk.*